

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 03/21612

A. CLASSIFICATION OF SUBJECT MATTER  
 IPC 7 C09B11/00 C09K11/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C09B C09K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, COMPENDEX

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MALPERT J H ET AL: "Color intensity control in polymers using triarylmethane leuconitriles as color formers" TETRAHEDRON, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 57, no. 6, 4 February 2001 (2001-02-04), pages 967-974, XP004316525 ISSN: 0040-4020 examples 2D-5D example 7.2.1 example 7.2.2 example 7.2.3 example 7.2.4	1,2
X	US 3 666 466 A (STRILKO PETER S) 30 May 1972: (1972-05-30) column 9-10	1,2

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "a" document member of the same patent family

Date of the actual completion of the international search

23 February 2004

Date of mailing of the international search report

15. 03. 04

Name and mailing address of the ISA

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 047 796 A (DU PONT) 9 November 1966 (1966-11-09) page 4; examples 12,31-34,41 ---	1
X	US 3 449 379 A (CESCON LAWRENCE ANTHONY ET AL) 10 June 1969 (1969-06-10) column 4; examples 5-8,15 ---	1
X	US 3 423 427 A (CESCON LAWRENCE ANTHONY ET AL) 21 January 1969 (1969-01-21) column 3-4; examples 3,12 ---	1
X	J. E. KUDER ET AL.: "Anodic and photochemical oxidation of triphenylmethanes" J.ORG.CHEM., vol. 44, no. 5, 1979, pages 761-766, XP002265479 column 3 column 10 figure 1 ---	1,2, 4-34,39, 40
X	FR 2 099 783 A (EASTMAN KODAK CO) 17 March 1972 (1972-03-17) page 3-4 table II ---	3,15-23
X	W.T.GRUENBAUM ET AL.: "Hole transport in triphenylmethane doped polymers" JPN. J. APPL. PHYS., vol. 35, 1996, pages 2704-2708, XP002271217 figure 1 ---	3,15-23
X	P.M. BORSENBERGER ET AL.: "Hole transport in vapor-deposited triphenylmethane gas" JPN. J. APPL. PHYS., vol. 35, 1996, pages 2698-2703, XP002271218 figure 1 ---	3,15-23
X	US 4 304 829 A (LIMBURG WILLIAM W ET AL) 8 December 1981 (1981-12-08) column 6-8; examples ---	3,15-23
X	US 3 739 000 A (MAGGIULLI C ET AL) 12 June 1973 (1973-06-12) column 1-4 ---	3,15-23
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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	P.M. BORSENBURGER, J.J. FITZGERALD: "Effects of the dipole moment on charge transport in disordered molecular solids" J. PHYS. CHEM., vol. 97, 1993, pages 4815-4819, XP002271219 figure 1 ---	3
X	US 4 140 529 A (PAI DAMODAR M ET AL) 20 February 1979 (1979-02-20)  column 6-11 ---	4-14, 24-34, 39,40
X	US 6 004 709 A (LIMBURG WILLIAM W ET AL) 21 December 1999 (1999-12-21) column 20 ---	15-23
X	H.W. GIBSON ET AL.: "Surface analyses by a triboelectric charging technique" ANALYTICAL CHEMISTRY, vol. 51, no. 4, 1979, pages 483-487, XP002271220 page 485 ---	15-23
X	R.H. YOUNG, J.J. FITZGERALD: "Dipole moments of hole-transporting materials and their influence on hole mobility in molecularly doped polymers" J. PHYS. CHEM., vol. 99, 1995, pages 4230-4240, XP002271221 table 1 -----	15-23

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>UC0213PCT1</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, Item 5 below.	
International application No. <b>PCT/US 03/21612</b>	International filing date (day/month/year) <b>09/07/2003</b>	(Earliest) Priority Date (day/month/year) <b>10/07/2002</b>
Applicant  <b>E.I. DU PONT DE NEMOURS AND COMPANY</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 8 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☒ Certain claims were found unsearchable (See Box I).

3. ☒ Unity of invention is lacking (see Box II).

4. With regard to the title,

☐ the text is approved as submitted by the applicant.

☒ the text has been established by this Authority to read as follows:

**CHARGE TRANSPORT COMPOSITIONS ON THE BASIS OF TRIARYLMETHANES AND THEIR USE IN ELECTRONIC DEVICES**

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

# INTERNATIONAL SEARCH REPORT

International application No.  
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## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 3(partly), 14(partly), 23(partly), 34(partly), 35-38, 41-47  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
see FURTHER INFORMATION sheet PCT/ISA/210
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 3(partly),14(partly),23(partly),34(partly),35-38,41-47

Claims 3, 14, 23, 34:

Support within the meaning of Article 6 PCT and disclosure within the meaning of Article 5 PCT is not found for all compounds claimed. In the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible.

Claims 35-38:

Present dependent claims 35-38 lack clarity (and/or conciseness) within the meaning of Article 6 PCT to such an extent as to render a meaningful search of the claims impossible, because no antecedent basis can be found for the disclosed technical features in the independent claim 4.

Claims 41-47:

These claims relate to an extremely large number of possible compounds/products/apparatus. Definition of essential features to define the compounds are not disclosed in the claims, with the consequence, that in the present case, the claims so lack support, and the application so lacks disclosure, that a meaningful search over the whole of the claimed scope is impossible.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-2

Triarylmethan on the basis of formula I, Fig.1 having the essential feature, that at least one substituent on an aromatic group is a fluoro-group.

2. Claim : 3

Compounds as defined in Fig.3, Formulae 1(i), 1(j), 1(l), 1(o), 1(q), 1(r), 1(s), without fluoro groups.

3. Claims: 4-14, 24-34, 39, 40

At least two triarylmethan carbons on the basis of formula II, Fig.2 and the use in an electronic device.

4. Claims: 15-23

Triarylmethan on the basis of formula I, Fig.1 without the essential feature, that at least one substituent on an aromatic group is a fluoro-group.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3666466	A	30-05-1972	NONE	
GB 1047796	A	09-11-1966	BE 649723 A CH 477019 A DE 1447777 A1 FR 93101 E NL 6407323 A US 3423427 A	16-10-1964 15-08-1969 10-04-1969 14-02-1969 28-12-1964 21-01-1969
US 3449379	A	10-06-1969	BE 649723 A CH 477019 A DE 1447777 A1 FR 93101 E NL 6407323 A	16-10-1964 15-08-1969 10-04-1969 14-02-1969 28-12-1964
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FR 2099783	A	17-03-1972	FR 2099783 A5	17-03-1972
US 4304829	A	08-12-1981	NONE	
US 3739000	A	12-06-1973	NONE	
US 4140529	A	20-02-1979	NONE	
US 6004709	A	21-12-1999	DE 69901053 D1 DE 69901053 T2 EP 1013695 A1 JP 2000191773 A	25-04-2002 18-07-2002 28-06-2000 11-07-2000